the most parsimonious cladogram. Three outgroup taxa, *Cidaria fulvata*, *Stamnodes pauperaria*, and *Larentia clavaria* were chosen for rooting the cladograms.

One most parsimonious cladogram was found (L = 452, ci = 0.21, ri = 0.47). However, the resulting cladogram (Fig. 1) is divided into two clades and does not support the monophyly of the Xanthorhoini. In the cladogram, *Scotopteryx*, *Epirrhoe*, and *Euphyia* were monophyletic, while *Enchoria*, *Zenophleps*, *Odontorhoe*, and *Xanthorhoe* were not monophyletic. Overlapping the character 'presence and length of coremata' with the most parsimonious cladogram showed that two states, long and short coremata, occurred independently in different clades and the state, long coremata, occurred three times independently in the cladogram. The overlap of the character 'presence of calcar' with the cladogram showed that the transition from the large, expanded shape of calcar to the digitate and relatively short calcar occurred three times independently. The future study including taxon sampling from the Nearctic region and character analysis from immature stages will reveal the monophyly of the Xanthorhoini and provide refined information on relationships among ingroup taxa.

Cladistic analysis of the subfamily Larentiinae

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Altogether about 230 species from 125 mostly Holarctic larentiine genera were studied preliminarily, checking the relations between traditionally recognized tribes. Synapomorphies of main generic clades are coded in the final matrix. Forty-six ingroup taxa and *Idaea aversata* (Linnaeus, 1758) as an outgroup species were included, 129 characters coded as unordered by convenience. The parsimony analysis using the application of Hennig86 yielded one weighted tree of 795 steps length, with consistency index, ci = 0,72 and rescaled consistency index, ri = 0,89. 17 suprageneric groups are supported by synapomorphic characters.

Synthesis. The monophyly of generic groups is analyzed using cladistic methodology, the sequence of resulting clades is defined by other means.

Larval chaetotaxy is studied fragmentarily. However, the Eudulini, Operophterini, Asthenini, Rheumapterini a.s.o. to the Eupitheciini, Chesiadini and Trichopterygini (cf. Table 1) bear four secondary setae laterally on the prolegs. The Lythriini, Xanthorhoini, Stamnodini, Larentiini and Hydriomenini have eight or more, the Euphyiini and Cidariini five or six secondary setae (according to literature, and original data). It is merely to decide which state of this character is primitive, and which is derived.

Males in three tribes, the Xanthorhoini, Cataclysmini and Euphyiini, have large coremata associated with membranization of last but one and last abdominal segments. In the Eupitheciini, the coremata are attached to the ninth segment and the male eighth sternite is specialized to open the female colliculum during the early phase of copulation (Mikkola 1994). The structures are not homologous, as well as the presence of two pairs of coremata on the male eighth abdominal segment in some Rheumapterini, and their sporadical occurrence in scattered cidariine and asthenine genera, judged by the differences in sclerotization of last abdominal segments.

The labides are present in several clades. The valvae often are ornamented and projecting distally at dorsal or ventral margin, or on both; only in the Chesiadini, the presence of a harpe is more or less constant.

A peculiar, *Eupithecia*-type of ornamentation of female bursa copulatrix with numerous spines having star-shaped or petaloid bases, is observed within Geometridae only in some tribes of Larentiinae and in some species-groups of the sterrhine genus *Idaea*. If the groups with the *Eupithecia*-type of bursa ornamentation are relatively derived, the groups with four secondary setae laterally on the larval prolegs are to be grouped with Eupitheciini, and the larger number of setae on the prolegs results to be less derived. An early analysis of Kuznetsov (1969), based on food-plant associations of tortricids, has shown the leading evolutionary trend from detritophagy to leaf-eating and further to antho- and carpophagy. The Perizomini are anthophagous, the Eupitheciini are antho- and carpophagous.

The same way, labides, branching from base of costa towards juxta and tegumen, more often occur in groups with four secondary setae on the larval prolegs. Labides are not derived in Chesiadini, and Trichopterygini, which have four secondary setae on the larval prolegs. However, a long dorsal projection from the valve costa base is present in both mentioned tribes: a precursor of labides? Labides as dorsal appendages of juxta characterize tribes with relatively more setose larvae.

The deduction of listed morphological peculiarities justifies the presented model of the arrangement and order of tribes within the subfamily Larentiinae, from the Lythriini, Cataclysmini and Xanthorhoini to the Eupitheciini and Trichopterygini (Tab. 1). The results also indicate directions for further study.

How to check the results of cladistic analysis of morphological datasets?

Molecular systematics up to now have provided much smaller data-sets than classical morphology, but it will allow to infer a large quantity of data which, analyzed by means of comparable methods, will conquer with, or complement the results obtained by morphological analyses in future.

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References

Kuznetsov, V. I. 1969. [Ecological connexions of Tortricidae with vegetation of Far East. – Papers presented on XXI yearly readings in memory of N. A. Kholodkovsky.] Leningrad: 27-52 (in Russian)

Mikkola, K. 1994. Inferences about the function of genitalia in the genus *Eupithecia*, with description of a new organ. – Nota lepid., Suppl. **5**: 73-78

Tab. 1. Estimating the sequence of tribes within the subfamily Larentiinae. Characters: 1, Star-shaped or petaloid signa in female bursa: present or absent; 2, Number of secondary setae on ventral proleg of mature larva; 3, The presence of hairy "labides" in the anellus region of male genital armature; 4, "Labides" arising from dorsal or lateral margin of juxta; 5, "labides" arising from the base of valve costa; 6, The base of valve costa with a long, simple projection bent dorsad

Tribes/characters	1	2	3	4	5	6
Lythriini		13-14				
Cataclysmini		?				
Xanthorhoini		8-10	labides	from juxta		
Larentiini		8-14				
Euphyiini		5-6				
Hydriomenini		12-18	labides	from juxta		
Stamnodini		11-18				
Cidariini		5-6	labides	from juxta		
Eudulini		4				
Operophterini		4	labides	from juxta		
Rheumapterini		4	labides		from valva	
Triphosini		4	labides		from valva	
Phileremini		4	labides		from valva	
Melanthiini	present +/–	4	labides	from juxta	from valva	
Asthenini	present –/+	4-5	labides	from juxta	from valva	simple
Perizomini		?	labides		from valva	
Eupitheciini	present	4	labides		from valva	
Chesiadini	present	4				simple
Trichopterygini	present	4				simple